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at the Lomonosov branch, however, was done for the navy. Missions assigned to the institute at Lomonosov included the development and manufacture of prototypes of an acoustic mine-firing unit, a target-seeking torpedo head, and a Walter power plant to be used as a propulsion unit for torpedoes.

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5. The German scientists were organized into three groups as follows

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- a. The Koll group, which worked on development of analyzers and sound spectrometers for the low-frequency range. The equipment was to be used for an acoustic mine fuse.
- b. The Gloede-Martin group, which worked on the development of analyzers and sound spectrometers for the high-frequency range to be installed in target-seeking torpedo heads.
- c. The Lavitschka<sup>3</sup> group, which worked on the development of Ingolin-type engines to be used for the propulsion of torpedoes.

6. Before 1943, the group headed by Koll had developed a low-frequency transmitter designated "Baraban" to be used in mine sweeping activities, but the work was discontinued when the institute was placed under control of the Ministry of Shipbuilding. The outstanding achievement of the Koll group was the development of a new type of sound analyzer utilizing so-called Tuttle-units. Resistance-capacity coupled oscillating circuits, having the property of eliminating a specific frequency from a bundle of frequencies, were installed in the instrument. The utilization of coupled Tuttle-units made it possible to increase the band width of the analyzer. The advantage of this type of set was that a fixed ratio existed between the band width and the frequency. Normally, a band width of three percent was selected. This meant that a frequency of three cycles per second was cut out when a frequency of 100 cycles per second was used. The analyzers developed made it possible to find out the essential frequencies of a sound in a few minutes. No effort was made to eliminate background noise or jamming. Source believed that the Soviets were interested in the project for its potentialities in measuring sounds produced by a ship in motion.

7. Another project completed by the Koll group involved the building of miniature oscillographic measuring ten cubic centimeters and designed to record data received by torpedo heads. Sound transmitters similar to those built by the Atlas Works at Bremen were used at Lomonosov. Equipment also incorporated Roumann-type recorders, which recorded measured sound values on wax paper.

8. The Gloede-Martin group worked in two sections. The group under Gloede developed an apparatus for the calibration of submarine sound receivers on the basis of the reciprocity principle. Experimental receivers were built incorporating ammonium dihydrogen phosphate crystals, which were prepared in Lissou and proved excellent. No efficient sound receivers were constructed, however, because the Soviet requirements for sensitivity of the sets were exaggerated. In 1952, receiver sets believed to be dismantled from torpedo heads arrived at the institute for the calibration of guide lines.

9. The Gloede group also constructed a sound spectrometer for high-frequency waves measuring 10,000 to 100,000 cycles per second. An operating procedure developed by Siemens-Freystadt was utilized. The equipment incorporated fixed filters of half-octave width, which were swept by a rotating switch. The values obtained were indicated in a cathode ray tube. The construction of the rotating switch presented difficulties to which no satisfactory solution was found.

10. The Martin group built a sound pressure meter designed for an intensity range from 0.1 to 1.000 microbar, and a frequency range from 50 to 10,000 cycles per second. The equipment never operated satisfactorily, however, because of the unreasonable specifications set. The Soviets were particularly interested in infrasonic and ultrasonic waves. Source believed, however, that what they were told by the German experts in this field did not go beyond information contained in the English manual by Coole.

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11. The group of engineers headed by Lawitschka developed an Ingolin-type motor for installation in torpedoes, designed to increase their speed and efficiency. Experiments were conducted in the park of Lomonosov Castle in an above-ground bunker the size of a one-story house, which was off-limits to all unauthorized personnel. Work on the Ingolin-type motor was later transferred to the Svetlov Plant at Feodosiya (N 45-02, E 35-24), in the Crimea, and Germans were allegedly excluded from this advanced developmental work. Another plant engaged in torpedo development work was said to be located at Makhachkala (N 42-58, E 47-27), near the Caspian Sea. Although some German experts were employed at the latter plant, Lawitschka was unable to effect a transfer from Lomonosov.
  
12. Professors Rusakov and Voroskiy (or Vorbskiy) from the Leningrad Bureau of Standards (sic) repeatedly visited the institute at Lomonosov and informed the German experts about requirements for sound analyzers and spectrometers. Rusakov was apparently well informed on the propagation of sound waves. Professor N. N. Andreyov, chief of the Institute of Acoustics of the Moscow Academy of Sciences visited the institute twice. Another Soviet scientist who visited the institute was Dr. Gutin, an expert in the field of noises produced by screws, and editor of a magazine on theoretical physics. Dr. Gutin worked at a Leningrad shipyard (located in grid square 03b of the Leningrad town plan). Source recalled the name of another Soviet, Kharkevich, who had been mentioned in scientific publications. The Soviets appeared unwilling to exploit the technical skill and experience of the German experts. For some time after their arrival, the latter had nothing to do because of Soviet delay in issuing precise orders, and even after the assignment of projects, the Germans worked in an atmosphere of distrust. 25X1
  
13. Facilities for scientific research work at Lomonosov were primitive. The German experts working on measuring instruments were assigned one large room about 15 meters square, which was equipped with work tables, plugs, and soldering irons. Switchboards which could be lowered were available. A water basin, seven meters long, four meters wide, and four meters deep, was used for sound measurements. The group also had at its disposal a precision mechanical workshop equipped with all the tools required for the manufacture of chassis and models. The Lawitschka group worked in a well-equipped workshop and also used the bunker in the park of the castle. Fuel for developmental work arrived in tank trucks driven by civilian personnel and was stored in tanks. Technical literature available at Lomonosov consisted of a few Soviet technical magazines, but an adequate supply of scientific literature was accessible at the Leningrad Municipal Library. 25X1

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